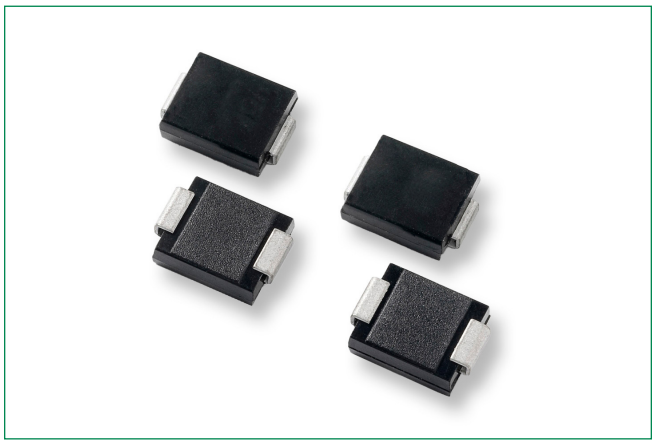
Pxxx0S3N Series

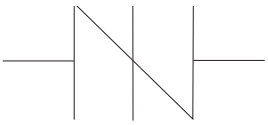
High Surge Current SIDACtor® - DO214AB



Agency Approvals

Agency	Agency File Number
	E133083

Schematic Symbol



Description

The Pxxx0S3N Series DO-214AB protection thyristors are components designed to protect equipment located in hostile environments from overvoltage transients.

The Pxxx0S3N Series protect exposed interfaces in industrial and ICT applications, such as RS-485 data interfaces, AC or DC power supplies. These components' switching voltage V_S are much lower than alternative Gas Discharge Tubes (GDT), and on-state voltage V_T are much lower than alternative GDTs, Metal Oxide Varistors (MOV) and TVS Diodes.

This Pxxx0S3N series are rated 3000A 8/20 µs, enabling equipment compliance with regulatory and customer surge requirements.

Features and Benefits

- Low voltage overshoot
- Low on-state voltage
- Component properties do not degrade after multiple surge events within its limits
- Fails short circuit when surged in excess of ratings
- Fast response in nanoseconds
- 3000A 8/20 µs Surge Rating
- RoHS Compliant and Halogen-Free
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin (Sn) (IPC/JEDEC J-STD609A.01)

Applicable Global Standards

- TIA-968-A
- TIA-968-B
- ITU K.20/21 Enhanced Level
- ITU K.20/21 Basic Level
- GR 1089 Inter-building
- GR 1089 Intra-building
- IEC 61000-4-5, 2nd Ed
- YD/T 1082
- YD/T 993
- YD/T 950

Electrical Characteristics

Part Number	Marking	V_{DRM} @I_{DRM}=5µA	V_S @100V/µs	I_H	I_S	I_T	V_T @I_T=2.2A	Capacitance @1MHz, 2V bias	
		V min	V max	mA min	mA max	A max	V max	pF min	pF max
P0080S3NLRP	P-8N	6	25	50	800	2.2	4	80	150
P0300S3NLRP	P03N	30	45	50	800	2.2	4	80	150
P0640S3NLRP	P06N	58	77	50	800	2.2	4	150	550
P0720S3NLRP	P07N	65	88	50	800	2.2	4	150	550
P0900S3NLRP	P09N	75	98	50	800	2.2	4	150	550
P1100S3NLRP	P11N	90	130	50	800	2.2	4	150	450
P1300S3NLRP	P13N	120	160	50	800	2.2	4	150	450
P1500S3NLRP	P15N	140	180	50	800	2.2	4	150	450
P1900S3NLRP	P19N	155	220	50	800	2.2	4	150	450
P2300S3NLRP	P23N	180	260	50	800	2.2	4	150	450
P2600S3NLRP	P26N	220	300	50	800	2.2	4	150	450
P3100S3NLRP	P31N	275	350	50	800	2.2	4	150	450
P3500S3NLRP	P35N	320	400	50	800	2.2	4	150	450
P3800S3NLRP	P38N	350	430	50	800	2.2	4	150	450

Notes:
- Absolute maximum ratings measured at T_A= 25°C (unless otherwise noted).
- Components are bi-directional (unless otherwise noted).

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Surge Ratings

Series	I_{PP} 8/20[1] 1.2/50[2]	I_{TSM} 50 / 60 Hz	di/dt
	A min	A min	A/µs max
N	2500/3000	250	420

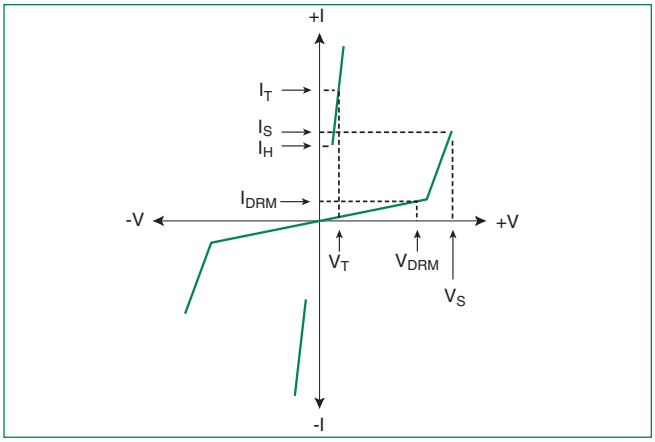
Notes:
1. Current waveform in µs
2. Voltage waveform in µs
3. Surge Rating 2500A for P0080S3NLRP and P0300S3NLRP

- Peak pulse current rating (I_{PP}) is repetitive and guaranteed for the life of the product.
- I_{PP} ratings applicable over temperature range of -40°C to +85°C
- The device must initially be in thermal equilibrium with -40°C ≤ T_J ≤ +150°C

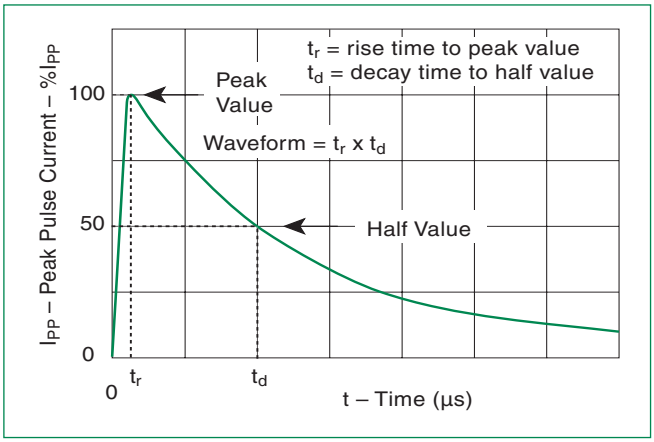
Thermal Considerations

Package	Symbol	Parameter	Value	Unit
DO-214AB	T_J	Operating Junction Temperature Range	-65 to +150	°C
	T_S	Storage Temperature Range	-65 to +150	°C
	$R_{\theta JA}$	Thermal Resistance: Junction to Ambient	75	°C/W

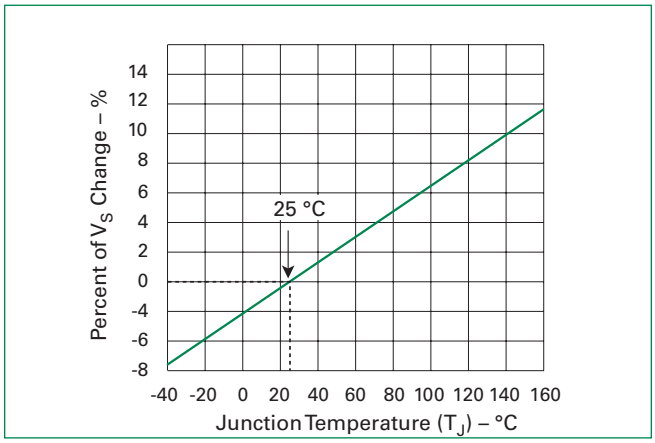
V-I Characteristics



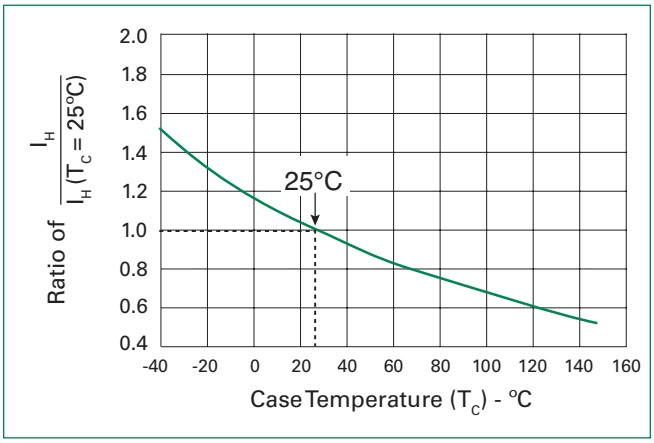
tr x td Pulse Waveform



Normalized VS Change vs. Junction Temperature



Normalized DC Holding Current vs. Case Temperature



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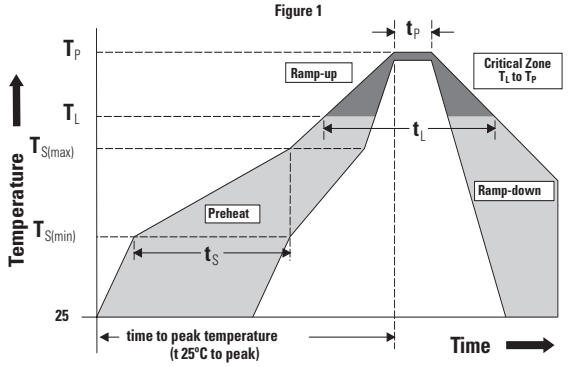
Soldering Parameters

Reflow Condition		Pb-Free assembly (see Fig. 1)
Pre Heat	**- Temperature Min ($T_{s(min)}$)**	+150°C
	- Temperature Max ($T_{s(max)}$)	+200°C
	- Time (Min to Max) (t_s)	60-120 secs.
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/sec. Max.
$T_{S(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max.
Reflow	**- Temperature (T_L) (Liquidus)**	+217°C
	- Temperature (t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max.
Ramp-down Rate		6°C/sec. Max.
Time 25°C to Peak Temp (T_P)		8 min. Max.
Do not exceed		+260°C

Figure 1



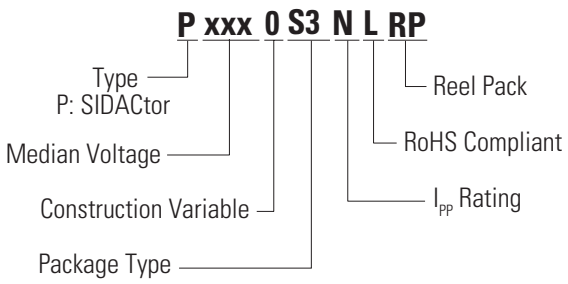
Physical Specifications

Lead Material	Copper Alloy
Terminal Finish	100% Matte-Tin Plated
Body Material	UL Recognized epoxy meeting flammability classification UL94-V0

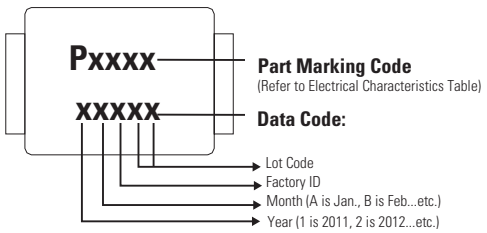
Environmental Specifications

High Temp Voltage Blocking	80% Rated V_{DRM} (V_{AC} Peak) +125°C or +150°C, 504 or 1008 hrs. MIL-STD-750 (Method 1040) JEDEC, JESD22-A-101
Temp Cycling	-65°C to +150°C, 15 min. dwell, 10 up to 100 cycles. MIL-STD-750 (Method 1051) EIA/JEDEC, JESD22-A104
Biased Temp & Humidity	52 V_{DC} (+85°C) 85%RH, 504 up to 1008 hrs. EIA/JEDEC, JESD22-A-101
High Temp Storage	+150°C 1008 hrs. MIL-STD-750 (Method 1031) JEDEC, JESD22-A-101
Low Temp Storage	-65°C, 1008 hrs.
Thermal Shock	0°C to +100°C, 5 min. dwell, 10 sec. transfer, 10 cycles. MIL-STD-750 (Method 1056) JEDEC, JESD22-A-106
Autoclave (Pressure Cooker Test)	+121°C, 100%RH, 2atm, 24 up to 168 hrs. EIA/JEDEC, JESD22-A-102
Resistance to Solder Heat	+260°C, 30 secs. MIL-STD-750 (Method 2031)
Moisture Sensitivity Level	85%RH, +85°C, 168 hrs., 3 reflow cycles (+260°C Peak). JEDEC-J-STD-020, Level 1

Part Numbering



Part Marking



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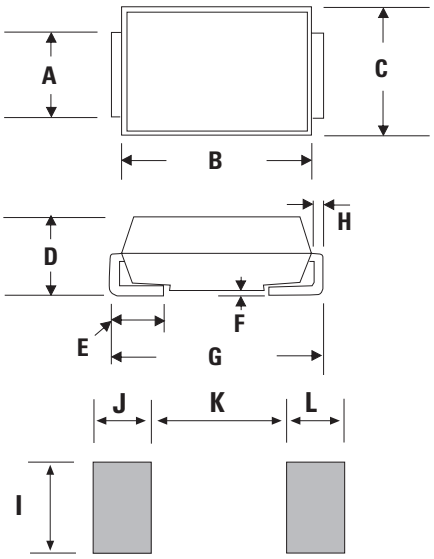
Dimensions — DO-214AB

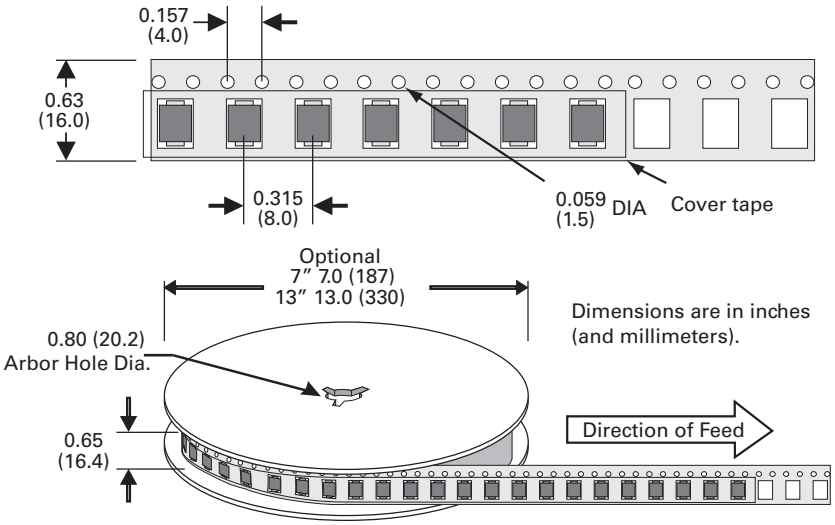


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.114	0.126	2.900	3.200
B	0.260	0.280	6.600	7.110
C	0.220	0.245	5.590	6.220
D	0.079	0.103	2.060	2.620
E	0.030	0.060	0.760	1.520
F	-	0.008	-	0.203
G	0.305	0.320	7.750	8.130
H	0.006	0.012	0.152	0.305
I	0.129	-	3.300	-
J	0.094	-	2.400	-
K	-	0.165	-	4.200
L	0.094	-	2.400	-

Packing Options

Package Type	Description	Quantity	Added Suffix	Industry Standard
S3	DO-214AB Tape and Reel Pack	3000	RP	EIA-481-D tape and reel specification

Tape and Reel Specification — DO-214AB



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